

Maslakow ('011) discloses and claims a housing which encapsulates a semiconductor die and isolates it from communication with the atmosphere outside the housing. Likewise, Fehr et al. disclose encapsulating a semiconductor die within a metal enclosure and subsequently encapsulating that enclosure within another plastic enclosure. The references do not suggest the desirability of providing a vent that allows communication of atmospheric pressure with a surface of a semiconductor die which contains active, working components such as a pressure transducer. Instead, the references teach away from providing a housing that allows the atmosphere outside the housing to be in pressure contact with the interior of the housing or the active surface of the pressure transducer. Maslakow ('011) fuses an unvented lid to his enclosure, forming a chemical and moisture barrier (see, e.g. col. 6 lines 33-56 and Figures 1 and 3). Fehr et al. discuss encapsulation of the semiconductor die within a metal enclosure and double encapsulation of the semiconductor die, encapsulating the metal enclosure within plastic in one embodiment, to isolate the semiconductor die from its surrounding atmosphere (see, e.g. col. 2 lines 5-16 and col. 2 line 62 - col. 3 line 8). References which do not suggest the desirability of the claimed invention or which teach away from the claimed invention cannot render the claimed invention obvious. Consequently, Applicants respectfully submit that the pressure transducer housing having a vent as claimed in claims 4, 5, 7, 10, and 11 is not obvious from Maslakow ('011) in view of Fehr et al.

The Examiner rejected claims 6, 12, and 14-18 under 35 U.S.C. § 103 as being unpatentable over Maslakow ('011) in view of Fehr et al. and Joiner, Jr. Joiner, Jr. teaches covering the active surface of a semiconductor die and either attaching a heat sink to the exposed inactive surface or leaving the inactive surface exposed to the atmosphere (the inactive surface is 14 or 36 of the figures - see also, e.g., col. 3 lines 52-57 and col. 4 line 54 - col. 5 line 9 and the summary of the invention). The moisture that is vaporized resides in the region where the inactive surface of the semiconductor die has delaminated from the encapsulating thermosetting plastic (see col. 3 line 52 - col. 4 line 9). As the patent notes, if this area is completely encapsulated, pressure builds within the semiconductor package, which cracks or "pops" because of the vapor's pressure. The vent permits water vapor to escape from the inactive surface of the semiconductor die, while the active surface of the semiconductor die remains encapsulated within the thermosetting plastic material.

Maslakow ('011) in view of Fehr et al. and Joiner, Jr. does not render the claim to the pressure transducer housing, claim 6, obvious. Claim 4, from which claim 6 depends, specifies a

vent in the housing to allow the portion of the housing containing the active surface of a pressure transducer to be in communication with the pressure of the atmosphere outside the housing.

Maslakow ('011), Fehr et al., and Joiner, Jr. all require the active surface of the semiconductor die to be encapsulated away from the atmosphere outside the housing. These references teach away from the claimed invention to a housing which allows communication of atmospheric pressure to the active surface of the pressure transducer. Consequently, the combination of these references cannot render claim 6 obvious.

Likewise, Maslakow ('011) in view of Fehr et al. and Joiner, Jr. does not render the claims to the pressure sensor, claims 12 and 14-18, obvious. Claim 12, from which claims 14-18 depend, specifies a vent in the housing to allow the active surface of the pressure transducer to be in communication with the pressure of the atmosphere outside the housing. Maslakow ('011), Fehr et al., and Joiner, Jr. all require the active surface of the semiconductor die to be encapsulated away from the atmosphere outside the housing. These references teach away from the claimed invention to a pressure sensor which allows communication of atmospheric pressure to the active surface of the pressure transducer. Consequently, the combination of these references cannot render claims 12 and 14-18 obvious.

The Examiner's official notice of use of silicone gel as an encapsulating material is noted with regard to claims 16 and 17. As used in the cited references, the encapsulating material is not in communication with the atmosphere outside the pressure sensor. The encapsulating material of the references is used within the sealed housing to protect the active side of the semiconductor die from damage. Consequently, claims 16 and 17 are not obvious from the references and the official notice.

Claim ⁶13 was rejected under 35 U.S.C. § 103 as being unpatentable over Maslakow ('011) in view of Fehr et al., Joiner, Jr., and Sing Deo et al. Sing Deo et al. also teach that their semiconductor package is to be sealed (see, e.g. col. 4 lines 39-47 and Figure 1, showing a completed semiconductor package wherein the semiconductor die is sealed within the package, and col. 5 lines 16-18 and Fig. 2, showing the package in a partially assembled condition without a top). Sing Deo et al. do not teach the desirability of having a vent that allows a pressure transducer within a housing to communicate with the atmosphere outside the housing. Maslakow ('011), Fehr et al., and Joiner, Jr. also do not teach the desirability of having a vent that allows a pressure transducer within a housing to communicate with the atmosphere outside the housing. In

fact, each reference teaches away from such communication. Because these references do not point to the desirability of Applicant's combination, and especially because these references teach away from the desirability of Applicant's combination, Applicant's claims, and especially claim 13, are patentable over the cited references.

The Examiner rejected claims 8, 9, and 19-22 under 35 U.S.C. § 103 as being unpatentable over Maslakow ('011) in view of Fehr et al. and Sing Deo et al. Maslakow ('011), Fehr et al., and Sing Deo et al. all each teach complete encapsulation of the active surface of the semiconductor die. Claims 8 and 9 claim a housing with a vent that allows communication of the active surface of the semiconductor die with the atmosphere outside the housing. The cited references do not point to the desirability of the combination, including the vent, of claims 8 and 9. Consequently, claims 8 and 9 are not obvious in view of these references.

Likewise, method claims 19 and 20 are not obvious, since these claims provide a vent hole to allow pressure communication between the chamber containing the pressure transducer and the atmosphere outside the pressure sensor. The pressure sensors of claims 21-22, which are made by the method of claims 19-20, are also not obvious from the cited references, since the references do not disclose the desirability of the vent as discussed above, and since the references teach away from the desirability of having the active surface of the semiconductor die in pressure communication with the atmosphere outside the pressure sensor.

The Examiner's citation of prior art made of record but not relied upon is noted. However, it is believed that this art is no more pertinent than the art relied upon by the Examiner and, in the absence of specific rejections of claims based on this art, need not be addressed further.

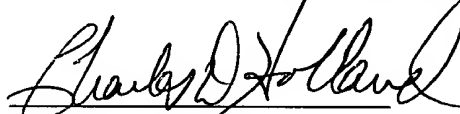
All claims in this application are in condition for allowance, and such action is earnestly elicited by the Applicant.

Attorney Docket No. 6010-706

The Commissioner is hereby authorized to charge any fees under 37 C.F.R. §§ 1.16 and 1.17 that may be required by this paper, and to credit any overpayment, to Deposit Account No. 23-2415 (Our Docket No. 6010.706). A duplicate of this paper is enclosed.

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